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Test 713: Case Model 810 (Diesel)

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NEBRASKA TRACTOR TEST NO. 713 - CASE 810 DIESEL

The University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director; Lincoln, Nebraska

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	Fuel Consumption		Hp-hr per gal	Temp. Degrees F			Barometer inches of mercury
					Gal per hr	Lb per hp-hr		Cooling med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—2nd Gear											
38.57	7240	2.00	1847	1.69	4.625	0.840	8.34	201	76	94	28.820
75% of Pull at Maximum Power—Ten Hours—2nd Gear											
36.94	5564	2.49	1987	0.93	4.658	0.884	7.93	207	77	95	28.756
50% of Pull at Maximum Power—Two Hours—2nd Gear											
31.73	3791	3.14	2286	0.94	5.295	1.170	5.99	202	75	85	28.805
MAXIMUM POWER WITH BALLAST											
40.41	14095	1.08	1857	6.00	1st Gear		183	72	84		28.870
40.00	7440	2.02	1866	1.52	2nd Gear		186	76	92		28.850
40.28	6538	2.31	1859	1.38	3rd Gear		179	73	80		28.850
36.78	3378	4.08	1851	0.69	4th Gear		186	72	84		28.850
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—2nd Gear											
Punds pull		7450	8400	9350	9900	11250	12650	13250			
Horsepower		40.0	40.3	39.9	37.0	36.0	33.7	31.8			
Miles per hour		2.0	1.	1.6	1.4	1.2	1.0	0.8			

Department of Agricultural Engineering

Dates of Test: August 14 to August 28, 1959

Manufacturer: J. I. CASE COMPANY, RACINE, WISCONSIN

Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 51 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8418 Weight per gallon 7.009 lb Oil SAE 40 API service classification DG and MS To motor 2.141 gal Drained from motor 1.335 gal Transmission lubricant type "C" torque converter oil Final-drive lubricant SAE No 140 Type transmission gear lube Total time motor was operated 39 hours.

ENGINE Make Continental diesel Type 4 cylinder vertical Serial No 5824 Crankshaft mounted lengthwise Rated rpm 2250 Lubrication pressure Bore and stroke 4" x 5½" Compression ratio 15.9 to 1 Displacement 277 cu in Cranking system 24 volts (four 6 volt batteries) Air cleaner oil washed wire screen Muffler was used Oil filter replaceable paper element Fuel filter one primary filter with replaceable cotton waste element, one secondary filter with replaceable pleated paper element and one final replaceable paper disc filter Cooling medium temperature control thermostat.

CHASSIS Type tracklayer Serial No 7081503 Tread width 54" Wheelbase 73" Drawbar height 14½" Measured length of track 19.3 feet Cleats integral with shoes Cleats per track 37 Size of cleats 15" x 2" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 38¾" Vertical distance above roadway 28" Horizontal distance from center of rear wheel tread 0" to the right or left Hydraulic control system direct engine drive Transmission two range fixed ratio with eight hydraulically controlled multiple disc clutches Advertised speeds mph first 0 to 1.6 second 0 to 2.9 third 0 to 3.3 fourth 0 to 6.0 reverse first 0 to 1.9 second 0 to 3.5 third 0 to 4.0 fourth 0 to 7.2 Clutches multiple disc operated hydraulically by hand levers or brake pedals Brakes foot pedals operating disc brakes hydraulically and hand lever for parking Steering by clutch levers controlling power shifting in two speed ranges, forward or reverse, for each track independently or by brake pedals Turning space diameter (with brake applied) right 166" left 166".

Total weight with operator 15,000 pounds including drawbar assembly 175 lbs, and rock guards 534 lbs.

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with SAE and ASAE test code. No belt pulley or power take-off available for this tractor, therefore no belt or power take-off performance tests. This tractor is equipped with an operator controlled power shifting partial range transmission with torque multiplier.

We, the undersigned, certify that this a true and correct report of official Tractor Test No 713.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor
Test Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, $\frac{1}{2}$ the 85% torque; maximum power; $\frac{1}{4}$ and $\frac{3}{4}$ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree

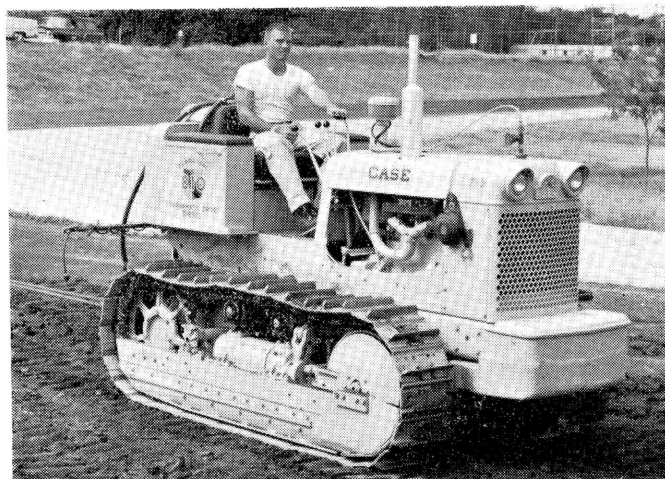
turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions; (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.



Case 810 Diesel